

CLAIMS

What is claimed is:

1. An optical communications system employing radio frequency signals, the system comprising:
 - a central unit;
 - at least one remote unit, said remote unit having at least one optoelectronic transducer for converting optical data signals to radio frequency signals and converting radio signals to optical signals and at least one antenna to receive and send radio frequency signals;
 - at least one optical fiber data link between the central unit and the remote unit for transmitting optical data signals therebetween; and
 - at least one optical fiber power link between the central unit and the remote unit for providing electrical power at the remote unit.
2. The optical fiber communications system according to claim 1 wherein the at least one optoelectronic transducer comprises an electroabsorption transceiver.
3. The optical communications system according to claim 1 wherein the remote unit comprises a first optoelectronic transducer for converting optical data signals to radio frequency signals and a second optoelectronic transducer for converting radio signals to optical signals.
4. The optical fiber communications system according to claim 3 wherein the first and second optoelectronic transducers are low power consumption devices.
5. The optical fiber communications system according to claim 4 wherein the second optoelectronic transducer comprises a VCSEL laser.

6. The optical fiber communications system according to claim 3 wherein the second optoelectronic transducer comprises an edge-emitting laser.
7. The optical fiber communications system according to claim 1 wherein the radio frequency signals are analog.
8. The optical fiber communications system according to claim 1 wherein the optical fiber data link is uni-directional.
9. The optical fiber communications system according to claim 8 wherein the uni-directional optical fiber data link is in a direction from the central unit to the remote unit.
10. The optical fiber communications system according to claim 8 wherein the uni-directional optical fiber data link is in a direction from the remote unit to the central unit.
11. The optical fiber communications system according to claim 1 wherein an optical fiber transports both the optical fiber data link and the optical fiber power link using wavelength division multiplexing.
12. The optical fiber communications system according to claim 1 wherein the radio frequency signals are used in a wireless communications system.
13. The optical fiber communications system according to claim 12 wherein the radio frequency signals comprise multiple radio carriers within multiple frequency bands with multiple protocols.

14. The optical communications system according to claim 1 wherein the remote unit comprises a first antenna to receive radio frequency signals and a second antenna to send radio frequency signals.

15. An optical communications system employing radio frequency signals, the system comprising:

a central unit;

at least one remote unit, said remote unit having means for converting optical data signals to radio frequency signals and converting radio signals to optical signals and at least one antenna to receive and send radio frequency signals;

at least one optical fiber data link between the central unit and the remote unit for transmitting optical data signals therebetween; and

at least one optical fiber power link between the central unit and the remote unit for providing electrical power at the remote unit.

16. A method for communicating between a central unit and at least one remote unit, said method comprising:

transmitting an optical data signal from the central unit to the remote unit through an optical fiber data link and transmitting radiation from the central unit to the remote unit through an optical fiber power link to electrically power the remote unit;

converting the optical data signal to a radio frequency signal at the remote unit through an optoelectronic transducer; and

sending the radio frequency signal into free space through at least one antenna connected to the remote unit.

17. A method for communicating between a central unit and at least one remote unit, said method comprising:

- transmitting radiation from the central unit to the remote unit through an optical fiber power link to electrically power the remote unit;
- receiving a radio frequency signal from at least one antenna connected to the remote unit;
- converting the radio frequency signal to an optical data signal at the remote unit through an optoelectronic transducer; and
- transmitting the optical data signal to the central unit through an optical fiber data link.

18. An optical communications system employing radio frequency signals, the system comprising:

- a central unit;
- at least one remote unit, said remote unit having means for converting optical data signals to radio frequency signals and converting radio signals to optical signals, means for converting optical data signals into baseband digital signals and converting baseband digital signals to optical data signals and at least one antenna to receive and send radio frequency signals;
- at least one optical fiber data link between the central unit and the remote unit for transmitting optical data signals therebetween; and
- at least one optical fiber power link between the central unit and the remote unit for providing electrical power at the remote unit.

19. The optical fiber communications system according to claim 18 wherein the baseband digital signals are used in a local area network protocol.

20. The optical fiber communications system according to claim 19 wherein the local area network protocol is Ethernet.

21. A remote terminal in an optical communications system employing radio frequency signals, said remote terminal connected with a central unit via at least one optical fiber and comprising:

- at least one antenna to receive and send radio frequency signals;
- at least one optoelectronic transducer for converting optical data signals to radio frequency signals from the antenna and for converting radio signals to optical signals for transmission to the central unit; and
- means for converting radiation transmitted from the central unit to electrically power the remote unit.